

The second division of the subject is the discussion of the leading cases which have been used to prove the actual uplift and subsidence of the land, such as the raised shore-lines of Norway and northern Europe, the bored pillars of the Temple of Serapis, near Naples, the raised beaches around the Baltic, and the submerged peat bogs and forests on the British coasts. Suess examines these cases in detail, and denies that they give any evidence of secular uplift. He rejects what are generally considered some of the best established of geological truths, such as the still progressive tilting of Scandinavia. Suess denies these popular conclusions, and during his argument claims that both Lyell and Darwin mistook kitchen middens for raised sea beaches. Suess examines the evidence in detail for each case, and maintains that the inferences based on it are invalid. The shore-lines of Norway he claims to have been formed along the shores of glacier-dammed lakes. The Temple of Serapis, he maintains, has no connection with secular movements, because it is actually in the breached crater of a volcano. Submerged forests, he points out, may be due to growth behind storm beaches, or on land along a low shore which has sunk by the shrinkage of an underlying water-logged bed. The raised beaches around the inner Baltic he explains by the gradual lowering of the water by the emptying of that sea. The slow emergence of the north Baltic shore is, therefore, according to Suess, the consequence of a climatic change, not of an earth movement; and Suess advances evidence to prove that the level of the southern Baltic has been constant throughout historic times.

The latter part of this volume is perhaps of most popular interest, but it is the least convincing part of the "Antlitz," and perhaps the least essential to Prof. Suess's main position. Suess admits some cases of uplift, as at the Temple of Serapis, and he admits that some of the lower Norwegian shore-lines are true sea beaches. We may accept Dr. Günther's evidence showing that the uplift near Naples was somewhat wider than Suess admitted, or accept a slow uprise of the land near the great lakes of America, without rejecting the doctrine that the major changes in the range of the sea are due to changes in its level. Suess only briefly refers to the phenomenon of isostasy; and the work of Colonel Burrard in India shows that the plumb-line agrees with the pendulum as to the unequal density of the blocks in the earth's crust; and therefore some areas may have been uplifted to restore that hydrostatic equilibrium at which others are still upheld.

The second division of this volume shows that the easy inference that every submerged forest and every raised beach involves a movement of the land is not justified. Suess shows that they can be explained without any assumption of earth movements. Each case must be judged on its merits. We can accept either the explanation of a limited emergence or submergence of the land without rejecting Prof. Suess's main proposition that, in the geological past, the major changes in the range of the sea have been due to variations in its level.

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REFUSE DESTRUCTORS.

- (1) *The Disposal of Municipal Refuse.* By H. de B. Parsons. Pp. x+186. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1906.) Price 8s. 6d. net.
- (2) *Garbage Crematories in America.* By W. M. Venable, M.S. Pp. x+200. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1906.) Price 8s. 6d. net.

(1) THE author has not attempted in this book to produce a treatise dealing with the designing of the details for the final disposal of city refuse, but rather to set forth clearly the principles underlying the sanitary and economic handling and destruction of such material. The book owed its origin to certain designs which Mr. Parsons was engaged upon in connection with the disposal of the refuse of the city of New York, and as a result the bulk of the appliances and plant which the author describes are those which are employed in the Empire City, and there is a number of excellent reproductions of photographs of the methods adopted in that city both for collecting and for disposing of the refuse.

In chapter iii. it is shown that the general refuse for which a method of collection and disposal must be provided can be divided into five classes:—(1) ashes; (2) garbage; (3) rubbish; (4) street sweepings; and (5) snow; and tables are given to show the average composition of the first four of these, and the weight which has to be collected annually in a number of selected American cities; in New York the refuse varies from 2.6 lb. to 4.9 lb. per head per diem. The methods of collecting the various classes of refuse are then dealt with, and the author rightly lays stress on the absolute need of arranging the collections at regular intervals, and of the use of properly designed, covered, and water-tight carts; the important problem of cleansing streets crowded with vehicular traffic is also briefly discussed.

In the next two chapters the methods of disposal are taken up, and the various systems in use contrasted and compared; such processes as those of dumping on land or dumping in water should never be permitted; they are hopelessly insanitary; one of the illustrations—"Disfigurement of Beach by Dumping at Sea"—is a striking instance of the abominable results which may arise from such cheap and nasty methods. Mr. Parsons is evidently of opinion that the reduction process (only applicable when the garbage is separately collected), by which oil and grease are extracted and sold, can never be made a paying process, and it seems, therefore, highly undesirable to put up plants of this nature, when they are liable to produce such serious nuisance from foul smells. It is pointed out that the incineration process, which has been such a success in the cities of England and Germany, has so far not been adopted on a large scale in the United States, but the author considers that this method is bound to become more and more common in the States; where it has been a failure it is entirely due to faulty design of the destructors, and to the desire unduly to cheapen first cost.

Undoubtedly the form of civic government in

America, with its frequent changes of administration and its too often objectionable policy of the spoils to the victors, renders such problems as the economic and sanitary disposal of city refuse much more difficult to solve than in the case of the cities of Europe, where the municipal engineering and sanitary staff have much greater influence and powers of control.

(2) Called upon to remedy defects in existing crematories in the United States, Mr. Venable has made a complete study of the principles of design of every type of crematory so far built in the States, and this book is the result. In an introductory chapter the author points out that the crudity of the methods of disposal still in use in many cities is almost incredible, and he traces much of the slow progress of reform in this matter to the frequent changes in the administrative officials. In the second chapter tables are given as to the quantities which have to be collected, and the average composition of the refuse in a few large cities; in four cities in the States the weight per head per annum ranges from 1140 lb. to 1670 lb.

The problem of burning refuse without offence is then taken up, and Mr. Venable insists on the absolute importance of so designing the furnace that a temperature is reached which renders the discharge of odours from the chimney stack impossible. In chapter iv. the various types of crematories are divided up into classes, based on the fact that there is, or is not, some attempt at preliminary drying; each class is then described in some detail, and illustrations are given of a well-known example of each class, and lists of all the patents so far granted in the States for such crematories; the next chapter deals with the cost of working destructors, and the heat available from the products of combustion for steam raising.

In chapter vi. a complete history is given of the building of crematories in the States from 1887, the pioneer year, to the present date, and sectional drawings are reproduced of many of the furnaces which have been put up during that period. Mr. Venable is an advocate for the separate collection of garbage, refuse, and ashes, and, therefore, while quite ready to admit that the destruction of refuse in England, where usually the whole of the refuse is collected in one receptacle, is admirably carried out at the present day, he does not think that the British type of destructor is ever likely to come into extensive use in America; he, however, gives details of some of the tests carried out on Meldrum furnaces in Great Britain. In the last three chapters the materials and methods of construction likely to give the most satisfactory results are discussed, and, lastly, a draft specification is given.

These two books will be extremely interesting to English municipal authorities, because they deal fully with the methods of disposal of city refuse in the United States, methods which differ radically from those in use in our own country, and, while still convinced that we are ahead of our Transatlantic cousins in this important sanitary problem, nevertheless there is much we can learn from them.

SOME RECENT WORKS ON PHYSIOLOGY.

On Carbohydrate Metabolism, with an Appendix on the Assimilation of Carbohydrate into Proteid and Fat, followed by the Fundamental Principles and the Treatment of Diabetes, dialectically discussed. By Dr. F. W. Pavy, F.R.S. Pp. xi+138. (London: J. and A. Churchill, 1906.) Price 6s. net.

The Dynamics of Living Matter. By Prof. Jacques Loeb. (Columbia University Biological Series, No. 8.) Pp. xi+233. (New York: The Columbia University Press; London: Macmillan and Co., Ltd., 1906.) Price 12s. 6d. net.

Geschmack und Geruch. By Dr. Wilhelm Sternberg. Pp. viii+149. (Berlin: Julius Springer, 1906.) Price 4 marks.

DR. PAVY'S new book on carbohydrate metabolism deals with a subject to which he has devoted a long life of study and original research, and his opinions are therefore entitled to the most careful consideration and respect. He treats the subject partly from the physician's point of view, for the disease known as diabetes cannot be properly understood until the nature of the metabolism which the carbohydrates undergo in health is a matter of certain knowledge. Those acquainted with Dr. Pavy's previous writings will be aware that he has never accepted the glycogenic theory of Claude Bernard, and in the present brochure he brings forward fresh evidence of what he regards as its incorrectness. Dr. Pavy also was the first to direct attention to the glucoside nature of the proteids, and this view is also amplified. Most attention, however, will be centred on the new doctrine of absorption he puts forward, and to the important rôle in this process which he assigns to the lymphocytes. He supposes that what first occurs is that these cells assimilate nutrient matter and incorporate it in their protoplasm, and subsequently carry it to the tissues. Among other facts in support of this view he directs attention to the great increase in the lymphocytes of the blood after a meal. One imagines this view will not be immediately accepted, partly because it is doubtful whether the lymphocytes are sufficiently numerous, or capable of sufficiently rapid integration and disintegration to bear the burden of the large amount of material which has to be transported, and partly because the acceptance of such a theory will involve the rejection of much recent physiological work in which it has been shown that the food-proteids are broken down during digestion into the small molecules of the amino-acids of which they are composed. Dr. Pavy has produced an interesting and suggestive book, but he has made no experimental attempt to disprove the new ideas of complete hydrolysis of proteids in the intestine which are rapidly gaining credence.

Prof. Jacques Loeb's book is the outcome of a series of lectures he gave at Columbia University in 1902. He has entitled it the "Dynamics of Living Matter," and it is an attempt to explain the phenomena of life on the basis of physical chemistry. Prof. Loeb has